

1 1.1 Ratios and Proportions



Proportion: two equal ratios

Extraneous solutions:

A solution of a simplified version of an equation that does not satisfy the original equation. Watch out for extraneous solutions when solving equations with variables of rational expressions.

Extraneous solutions are not solutions at all. They arise from outside the problem, from the method of solution. They are extraneous because they are not solutions of the original problem.

YOU MUST CHECK YOUR WORK!!

Solve the proportion and check for extraneous solutions

$$1. \frac{2}{3} = \frac{3}{w}$$

$$\frac{2}{3} = \frac{3}{w}$$

$$2w = 3 \cdot 3$$

$$\frac{2w}{2} = \frac{9}{2}$$



$$w = 4\frac{1}{2}$$

$$2. \frac{10}{m} = \frac{2m}{5}$$



Solve the proportion and check for extraneous solutions

$$3. \frac{-3}{d} = \frac{d-3}{2d}$$

$$4. \frac{2u-3}{4u} = \frac{u-1}{u}$$

$$-3 \cdot 2d = d(d-3) \quad (2u-3) = 4u(u-1)$$

$$-6d = d^2 - 3d \quad 2u^2 - 3u = 4u^2 - 4u$$

$$+6d \quad +6d \quad -2u^2 \quad -2u^2$$

$$0 = d^2 + 3d$$

$$0 = d(d+3)$$

-3

$$d=0 \quad d+3=0$$

$$-3u = 2u^2 - 4u$$

$$+3u \quad +3u$$

$$0 = 2u^2 - 1u$$

$$u(2u-1)=0$$

$$u=0 \quad u=\frac{1}{2}$$



Solve the proportion and check for extraneous solutions

$$5 \cdot \frac{x+3}{4} = \frac{x}{5}$$

$$6 \cdot \frac{x+3}{x+5} = \frac{x-3}{-5}$$

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Solve the proportion and check for extraneous solutions

$$7. \frac{y^2 - 9}{y + 3} = \frac{y - 3}{2}$$

$$8. \frac{6}{19n} = \frac{-2}{n^2 + 2}$$

$$\frac{(y+3)(y-3)}{\cancel{y+3}} = \frac{y-3}{2}$$

$$\frac{y-3}{1} = \frac{y-3}{2}$$

$$\begin{aligned} 2(y-3) &= (y-3) \\ 2y - 6 &= y - 3 \\ -y - 6 &= -3 \\ +6 + 6 & \\ y &= 3 \end{aligned}$$